

REMARKS/ARGUMENTS

The Applicants respectfully request further examination and reconsideration in view of the amendments above and the arguments set forth below. Within the Office Action, the Abstract is objected to under M.P.E.P. § 608.01(b); the drawings are objected to under 37 C.F.R. § 1.83(a); claims 1-3, 5-24, 27-30, 33-37, 39-53, 56-59, and 62-65 are rejected under 35 U.S.C. § 112, second paragraph; claims 1-3, 5, 6, 8, 15-20, 27, 29, 30, 34-37, 39, 40, 42, 49, 56, 59, and 62 are rejected under 35 U.S.C. § 102(b); claims 7, 9-14, 28, 33, 41, 43-48, 57, 58, and 63-65 are rejected under 35 U.S.C. § 103(a); and claims 21-24 and 50-53 are objected to. Claims 1-3, 5-24, 27-30, 33-37, 39-53, 56-59, and 62-65 were pending in this application.

By way of the above amendments, the Abstract has been amended; Figures 12 and 13 have been added in the new Sheet 12; the Specification has been amended to describe Figures 12 and 13; and claims 1, 20, 35, and 49 have been amended. Accordingly, Claims 1-3, 5-24, 27-30, 33-37, 39-53, 56-59, and 62-65 are now pending.

Objection to the Specification

Within the Office Action, the Abstract is objected to under M.P.E.P. § 608.01(b). Specifically, it is stated that the Abstract improperly uses phrases that “can be implied such as ‘is disclosed’.” The Abstract has been amended to delete the phrase “is disclosed.”

Within the Office Action, the Specification has been objected to for improperly incorporating subject matter, at page 7, line 23, by reference to attorney docket number. In response to the objection, the Specification has been amended to include both the application number and the filing date of the reference.

For the above reasons, the objections to the Specifications should be withdrawn.

Objection to the Drawings

Within the Office Action, the drawings are objected to under 37 C.F.R. § 1.83(a). Specifically, it is stated that the drawings do not show several features recited in the claims: “the heat generating device is formed integrally with the bottom surface of the interface layer,” recited substantially in claims 28 and 57 (mistakenly referred to in the Office Action as claims 27 and 58); and “the patterned semiconductor is formed on an interface layer,” as substantially recited in claim 63. (Claim 63 actually recites, “wherein the step of forming an interface layer comprises patterning a semiconductor device and etching the patterned semiconductor device to form the

interface layer.”) It is further stated that to avoid abandonment, corrected drawings are required under 37 C.F.R. § 1.121(d).

In response to the objection, Figures 12 and 13 have been added on the new Sheet 12. Figure 12 illustrates the features recited in claims 28 and 57, and Figure 13 illustrates the features recited in claim 63. Because Figures 12 and 13 recite the elements disclosed in the original claims 28, 57, and 63, Figures 12 and 13 do not contain new matter. *See* M.P.E.P. § 706.03(o) (Rev. 2, May 2004) (no new matter if elements in claim added to drawing); M.P.E.P. § 608.01(l) at 600-73 (Rev. 2, May 2004) (When an “original claim itself constitutes a clear disclosure of [the] subject matter . . . [then a] requirement [should be] made to amend the drawings and description to show this subject matter.”). Figures 12 and 13 do not contain new matter for the additional reason that they contain matter disclosed in the Specification as filed. M.P.E.P. § 2163.06 at 2100-182 (Rev. 2, May 2004) (“[I]nformation contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter.”). Figure 12 illustrates subject matter described in the Specification at, for example, page 10, lines 3-4, and page 17, lines 14-16. Figure 13 illustrates subject matter described in the Specification at, for example, page 5, lines 8-10, and page 17, lines 22-27. Because Figures 12 and 13 illustrate the features recited in claims 28, 57, and 63, the objection to claims 28, 57, and 63 should be withdrawn.

Rejections Under 35 U.S.C. §112

Within the Office Action, Claims 1-3, 5-24, 27-30, 33-37, 39-53, 56-59, and 62-65 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regard as their invention. Specifically, it is stated that the claims 1, 20, 35, and 49 improperly recite that the plurality of openings and the plurality of routes are contained in a single plane. It is further stated, “It is not clear how the openings (105,110,115) or routes, which has [sic] a thickness dimension, can lie in a single plane.”

In response to the rejection under 35 U.S.C. § 112, second paragraph, claims 1, 20, 35, and 49 have all been amended to recite that a *cross-section* of the openings and a *cross-section* of the routes lie or substantially in a single plane. Accordingly, the rejection of claims 1, 20, 35, and 49 should be withdrawn.

Rejections Under 35 U.S.C. §102(b)

Galyon

Within the Office Action, claims 1-3, 5, 6, 8, 20, 27, 29, 30, 35-37, 39, 40, 42, 49, 56, and 59 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,016,090 to Galyon et al. The Applicants respectfully traverse these rejections.

Galyon is directed to an integrated circuit cooling module. As Galyon explains in its Abstract, the module comprises two sets of channels that run perpendicular to one another. A first set is formed on a base plate and the second set, perpendicular to the first, includes a set of inlet channels and a set of interleaved outlet channels. Galyon does not disclose stacked routes as recited in the independent claims 1 and 35 of the present invention.

The independent claim 1 is directed to a heat exchanger comprising a manifold layer coupled to an interface layer. The manifold layer has a first plurality of openings for providing a cooling material to the heat exchanger and a second plurality of openings for removing the cooling material from the heat exchanger. The interface layer has a plurality of stacked routes. Each route extends from one of the first plurality of openings and terminates at a corresponding one of the second plurality of openings. Each route is for carrying the cooling material. A cross-section of the plurality of routes is substantially contained in a plane non-parallel to a heat-exchanging plane.

As described above, Galyon does not disclose an interface layer having a plurality of stacked routes, as recited in claim 1. For at least this reason, claim 1 is allowable over Galyon.

Claims 2, 3, 5, 6, 8, 20, 27, 29, and 30 all depend on the independent claim 1. As described above, the independent claim 1 is allowable over the teachings of Galyon. Accordingly, claims 2, 3, 5, 6, 8, 20, 27, 29, and 30 are also all allowable as being dependent on an allowable base claim.

The independent claim 35 is directed to a method of forming a heat exchanger. The method comprises forming a manifold layer and forming an interface layer coupled to the manifold layer. The manifold layer has a first plurality of openings for providing a cooling material to the heat exchanger and a second plurality of openings for removing the cooling material from the heat exchanger. The interface layer has a plurality of stacked routes that each extends from one of the first plurality of openings and terminates at a corresponding one of the second plurality of openings. The routes are for carrying the cooling material. A cross-section of the plurality of routes is substantially contained in a plane non-parallel to a heat-exchanging

plane.

As described above, Galyon does not disclose an interface layer having a plurality of stacked routes, as recited in claim 35. For at least this reason, claim 35 is allowable over Galyon.

Claims 36, 37, 39, 40, 42, 49, 56, and 59 all depend on the independent claim 35. As described above, the independent claim 35 is allowable over the teachings of Galyon. Accordingly, claims 36, 37, 39, 40, 42, 49, 56, and 59 are also all allowable as being dependent on an allowable base claim.

Meyerhoff

Within the Office Action, claims 1-3, 5, 6, 8, 15-20, 27, 29, 30, 34-37, 39, 40, 42, 49, 56, 59, and 62 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,361,195 to Meyerhoff. The Applicants respectfully traverse these rejections.

Meyerhoff is directed to a heat sink for a semiconductor device. Referring to Figure 10, for example, Meyerhoff discloses a heat sink 206 coupled to an adapter unit 208. The heat sink 206 contains passageways 210 that, together with passageways 212 in the adapter unit 208, provide a fluid flow path. Meyerhoff does not disclose stacked routes as recited in the independent claims 1 and 35 of the present invention.

As explained above, claim 1 recites, in relevant part, an interface layer with a plurality of stacked routes. As described above, Meyerhoff does not disclose stacked routes as recited in claim 1. For at least this reason, claim 1 is allowable over Meyerhoff.

Claims 2, 3, 5, 6, 8, 15-20, 27, 29, 30, and 34 are all dependent on the independent claim 1. As described above, the independent claim 1 is allowable over the teachings of Meyerhoff. Accordingly, claims 2, 3, 5, 6, 8, 15-20, 27, 29, 30, and 34 are also all allowable as being dependent on an allowable base claim.

As explained above, claim 35 recites, in relevant part, forming an interface layer having stacked routes. As described above, Meyerhoff does not disclose forming an interface layer having stacked routes, as recited in claim 35. For at least this reason, claim 35 is allowable over the teachings of Meyerhoff.

Claims 36, 37, 39, 40, 42, 49, 56, 59, and 62 are all dependent on the independent claim 35. As described above, the independent claim 35 is allowable over the teachings of Meyerhoff. Accordingly, claims 36, 37, 39, 40, 42, 49, 56, 59, and 62 are also all allowable as being dependent on an allowable base claim.

Rejections Under 35 U.S.C. § 103(a)

Within the Office Action, claims 7, 9-14, 41, and 43-48 have been rejected under 35 U.S.C. § 103(a) as obvious over Meyerhoff. Within the Office Action it is stated that Meyerhoff substantially discloses all of the Applicants' invention, except for a suitable material for the thermal interface layer. The Applicants respectfully traverse these rejections.

Claims 7 and 9-14 all depend on claim 1. As explained above, claim 1 is allowable over Meyerhoff. Accordingly, claims 7 and 9-14 are all also allowable as depending on an allowable base claim.

Claims 41 and 43-48 all depend on claim 34. As explained above, claim 34 is allowable over Meyerhoff. Accordingly, claims 41 and 43-48 are all also allowable as depending on an allowable base claim.

Within the Office Action, claim 33 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Meyerhoff in view of U.S. Patent No. 5,309,319 to Messina. Within the Office Action, it is stated that Meyerhoff discloses substantially all of the Applicants' invention, except for a pump, as disclosed in Messina. The Applicants respectfully traverse this rejection.

Claim 33 depends on claim 1. As explained above, claim 1 is allowable over Meyerhoff. Accordingly, claim 33 is allowable over Meyerhoff, Messina, and their combination.

Within the Office Action, claim 64 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Meyerhoff in view of U.S. Patent No. 5,274,920 to Mathews. Within the Office Action, it is stated that Meyerhoff discloses substantially all of the Applicants' invention, except for a plates with flow channels formed by stamping, as disclosed in Mathews. The Applicants respectfully traverse this rejection.

Claim 64 depends on claim 35. As explained above, claim 35 is allowable over Meyerhoff. Accordingly, claim 64 is allowable over Meyerhoff, Mathews, and their combination.

Within the Office Action, claim 65 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Meyerhoff in view of U.S. Patent No. 6,477,045 to Wang. Within the Office Action, it is stated that Meyerhoff discloses substantially all of the Applicants' invention, except for a plates with flow channels formed by injection molding, as disclosed in Wang. The Applicants respectfully traverse this rejection.

Claim 65 depends on claim 35. As explained above, claim 35 is allowable over Meyerhoff. Accordingly, claim 65 is allowable over Meyerhoff, Wang, and their combination.

Within the Office Action, claims 28, 57, 58, and 63 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Meyerhoff in view of U.S. Patent No. 5,099,311 to Bonde et al. and U.S. Patent No. 6,492,200 to Park et al. or U.S. Patent No. 3,771,219 to Tuzi et al. Within the Office Action, it is stated that Meyerhoff discloses substantially all of the Applicants' invention, except for the limitation that a heat generating device is integrally formed at the bottom of the interface layer, as disclosed in Bonde combined with either Park or Tuzi. The Applicants respectfully traverse these rejections.

Claim 28 depends on claim 1, claims 57, 58, and 63 all depend on claim 35. As explained above, claims 1 and 35 are both allowable over Meyerhoff. Accordingly, claims 28, 57, 58, and 63 are all allowable over Meyerhoff, Bonde, Park, Tuzi, and their combination.

No new matter has been added

No new matter has been added by these amendments. As explained above, the amendments to the drawings find support in, for example, the Specification and the claims of the application as filed. The amendments to claims 1 and 35 reciting stacked routes find support throughout the application as filed, such as at page 2, lines 7-10; page 9, at lines 9-12; and at page 11, lines 14-24. The amendments to claims 1, 20, 35, and 49, reciting cross-sections, find support throughout the application as filed, such as in the cross-sectional and perspective drawings shown in Figures 1 and 2 and the accompanying text.

Allowable Subject matter


Within the Office Action, it is stated that claims 21-24 and 50-53 would be allowable if rewritten to overcome the rejections under 35 U.S.C. § 112, second paragraph, and to include all of the limitations of the corresponding base claims and any intervening claims.

CONCLUSION

For the reasons given above, the Applicants respectfully submit that claims 1-3, 5-24, 27-30, 33-37, 39-53, 56-59, and 62-65 are now in a condition for allowance, and allowance at an early date would be appreciated. If the Examiner has any questions or comments, the Examiner is encouraged to call the undersigned at (408) 530-9700 to discuss them so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: 7-5-05

By: 
Thomas B. Haverstock
Reg. No. 32,571
Attorney Applicants

CERTIFICATE OF MAILING (37 CFR § 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the U.S. Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450

HAVERSTOCK & OWENS LLP.

Date: 7-5-05 By: 